Gender/sex dimension in research – how to address it in research projects?

What the sex/gender dimension in research is **not**?

- It is **not** the gender balance of teams, that is a separate issue

What is the sex/gender dimension in research (and education)?

- Taking into account differences, both biological (sex) or social (gender), in research questions, from *in silico*, through *in vitro* all the way to *in vivo* systems
- Integrating the gender dimension into educational activities, including teaching curricula and public engagement

At what stage should the sex/gender dimension in research be considered?

- setting research priorities
- formulating research questions
- developing methodologies
- gathering and analysing sex-disaggregated data
- evaluating and reporting results
- transferring them to markets as innovations and products

Examples of the sex/gender dimension applied to research at IOCB:

- Sequence analyses: what is the make up of the populations that individual sequences have been sourced from? Can you sex-disaggregate the data? If not, why is that?
- Studies in cells: where cell lines are used to look at effects, state whether the cells originate from men or women and consider ensuring that both are used. Then report the results in a sex-disaggregated manner.
- Studies in animals: to avoid creating a sex data gap, animals of both sexes should be used. Then report the results in a sex-disaggregated manner.
- If discussing potential drug candidates that might go into clinical trials in future, explain how trial participants should be both men and women and that data needs to be reported in a sex-disaggregated manner. (Even if you won't be the ones administering the trials).
- Outreach/public engagement activities: different types of activities are likely to appeal to girls versus boys (men versus women), what measures are you taking to make the message accessible to both?
- Using artificial intelligence for data mining, ensure that methodology is designed such that it will not perpetuate biases intrinsic to the training sets (eg. population genetics).

Gender/sex dimension in research – case studies

http://genderedinnovations.stanford.edu/fix-the-knowledge.html

This section presents case studies demonstrating-in very concrete ways-how methods of sex and gender analysis function to create gendered innovations.

View Case Studies for:

Science

Animal Research: Designing Health and Biomedical Research

Animal Research 2: Analyzing how Sex and Gender Interact

Genetics of Sex Determination: Rethinking Concepts and Theories

Stem Cells: Analyzing Sex

Textbooks: Rethinking Language and Visual Representations

Health & Medicine

Chronic Pain: Analyzing How Sex and Gender Interact

Colorectal Cancer: Analyzing How Sex and Gender Interact

Covid-19: Analyzing Sex and Analyzing Gender

De-Gendering the Knee: Overemphasizing Sex Differences as a Problem

Dietary Assessment Method: Analyzing How Sex and Gender Interact

Heart Disease in Diverse Populations: Analyzing Sex and Gender

Nanotechnology-Based Screening for HPV: Rethinking Research Priorities and Outcomes

Nutrigenomics: Analyzing Factors Intersecting with Sex and Gender

Osteoporosis Research in Men: Rethinking Standards and Reference Models

Prescription Drugs: Analyzing Sex and Gender

Systems Biology: Analyzing How Sex and Gender Interact

Engineering

Exploring Markets for Assistive Technologies for the Elderly: Engineering Checklist

Extended Virtual Reality: Analyzing Gender

Facial Recognition: Gender and Intersectionality in Machine Learning

Gendering Social Robots: Analyzing Gender

Haptic Technology: Analyzing Gender

HIV Microbicides: Rethinking Research Priorities and Outcomes

Inclusive Crash Test Dummies: Rethinking Standards and Reference Models

Human Thorax Model: Rethinking Standards and Reference Models

Machine Learning: Analyzing Gender

Machine Translation: Analyzing Gender

Making Machines Talk: Formulating Research Questions

Video Games: Engineering Innovation Processes

Environment

Agriculture: Embedding Gender Norms in Innovation Processes

Climate Change: Analyzing Gender, and Factors Intersecting with Gender

Environmental Chemicals: Designing Health and Biomedical Research

Housing and Neighborhood Design: Analyzing Gender

Marine Science: Analyzing Gender

Menstrual Cups: Life-Cycle Assessment

Quality Urban Spaces: Gender Impact Assessment

Smart Energy Solutions: Intersectional Approaches

Smart Mobility: Co-Creation and Participatory Research

Waste Management: Co-Creation and Participatory Design

Water Infrastructure: Participatory Research and Design

Gender/sex dimension in research – further insights

Why should we account for the sex/gender dimension in research?

- data gap: historic **data collected** primarily on **male populations**, with **little or no data** collected on **women**
- this limited data is used to **extrapolate** guidance/conclusions to **entire populations**
- „**average male**" is used as a **model** for the whole population, which is misleading
- this can lead to advice/treatment/equipment which is **irrelevant** or even **dangerous** for women
- where women are included in studies, **data** is often **not sex-disaggregated**, which means that separate recommendations cannot be made that apply to men or women

- future generations will use knowledge generated by the projects as the basis for building societies → it is crucial that the **knowledge** that is **created through research** and **transferred through education** is free of gender bias
- inclusion of sex/gender dimension generates **added value** in terms of research excellence, rigour, reproducibility and creativity
- brings **in-depth understanding** of all people's needs, behaviours and attitudes
- enhances the **societal relevance** of research and innovation
- integrating the gender dimension into educational activities is essential for the proper training of the next generations of researchers and innovators

> Examples of the problems caused by the data gap/male bias…
>
> o Personal protective equipment designed for the shape of the male body (eg. face shields, bulletproof vests, army uniforms/equipment)
> o Items of daily use designed for the average male (eg. smartphones too large for women's hands, seatbelts tested/car crashes analysed only on 50-percentile male crash dummy, voice recognition doesn't work well for female voices, automatic translation software biased)
> o Disease symptoms described are often those typical for men, but are generalised to the whole population, which can lead to misdiagnosis and inappropriate treatment of women
> o Drugs are tested on men more than on women (women are often left out for simplicity as female bodies are regarded as "too complicated"), but results are generalised to the whole population, which can lead to treatment being inappropriate for women
> o Female bodies physiologically have a higher proportion of fat, so some fat soluble drug molecules might be more readily available and be at wrong (potentially dangerous) dosages; metabolism of chemicals varies with phases of the menstrual cycle
> o Even at the cellular level, gene transcription and activation can differ between female and male cells
> o Drugs and technologies for women-specific problems are not prioritised/addressed at all (eg. no treatment for strong menstrual pains, design of breast pumps currently on the market inadequate)
> o Town planning, due to historical data gaps, does not take into account female needs, instead being biased towards male needs (types of public transport, amenities, child care/elderly care, distance between housing and workplace)
> o Lack of data on prevalence of gender-based violence makes it difficult to improve safety for women and girls in various settings (eg. workplaces, educational settings, public spaces, transport, medical centres, shelters, refugee camps, etc.)
> o As demonstrated by the pandemic, critical upheavals (large scale closures of school during covid19, displacement of refugees from war-hit countries) have more substantial effects on women

Gender/sex dimension in research – resources

Gendered Innovations in Science, Health & Medicine, Engineering and Environment: Case studies

European Institute for Gender Equality: Integration of the sex/gender dimension into research and teaching content

Genderové aspekty v projektech Horizont Evropa (6 minute summary video by Technology Centre CAS, in Czech)

Invisible Women: Data Bias in a World Designed for Men, Caroline Criado Perez (Abrams Press, 2019; Vintage Publishing, 2020)

Adding Sex-and-Gender dimension to your research, Tania Rabesrandratana, Science 13 Mar 2014

VŠCHT Cena Julie Hamáčkové kategorie (c) Studentské práce, které do výzkumu zahrnují analýzu dle genderu a/nebo pohlaví: např. Rozdílné vnímání recycklace vody nebo plastu, Odstrňování metforminu způsobujícího feminizaci ryb v roce 2021, Vliv deficience tryptofanu ve stravu matky na rozvoj úzkostných poruch u ptomků, Mikropolutanty a endokrinní disruptory ve vodě v roce 2020, Vliv nanotechnologií a arsenu na člověka v roce 2019

Portia – Gender in Science https://www.portiaweb.org.uk/ (non-profit organization, website includes a host of useful resources)

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